IN THE SPECIFICATION:

Please insert the following paragraph at page 14, between lines 2 and 3:

In Fig. 2, reference numerals 1030 and 1040 show a state that propagating light is received by the light receiving part 1010.

Please amend the paragraph beginning at page 17, line 26, as follows:

A ball IC is produced, for example, as follows:

(1) First, an Si sphere is made. Granular polycrystalline Si is melted inside a pipe with a diameter of 2 mm to form a quasi-spherical single crystal. After this, surface polishing is applied in a procedure similar to that for producing a ball bearing to make a complete sphere of 1 ~~mmϕ~~ mm.

Please amend the paragraph beginning at page 23, line 15, as follows:

The optical transmission medium 1700 is provided beforehand with cavities for embedding as shown in Fig. 8. The number of cavities for embedding can be one or plural. It is preferred that a plurality of cavities be made beforehand from the standpoint of the degree of freedom of layout. For example, it is possible to form an array of cavities. In Fig. 8, reference numeral 1741 denotes a cavity for embedding the light emitting part of the electronic device 1705. ~~An unused cavity~~ Unused cavities 1742 and 1744 can be filled with resin, etc. This is effective when light propagating through the optical transmission medium is scattered unnecessarily by unused cavities. It is also preferred to provide a difference in the etching characteristic between the resin that fills a cavity and its periphery to make it easier to remove the

filler of the cavity.

Please amend the paragraph beginning at page 24, line 4, as follows:

This embodiment uses a cavity 1740 to add the electronic device 1706 and a cavity 1743 to add the electronic device 1707.

Please amend the paragraph beginning at page 24, line 6, as follows:

As shown in Fig. 9, a region where the electronic device 1706 is added is removed and the cavity 1740 is exposed. Reference numeral 1760 denotes the removed part. Of course, such a process can be omitted if the electric wiring layer 1720 is not formed in the region 1730 shown in Fig. 7. Then, if the cavity 1740 is filled with some filler, this is removed by etching, etc. Then, the device is added in such a way that the light receiving part 1780 of the electronic device 1706 is embedded in the cavity 1740. Since the electronic device 1705 has the light emitting part, it is possible to connect between portions of the electronic devices 1705 and 1706 by optical wiring using the optical transmission medium 1700 which is not used until the electronic device 1706 is added.

Please amend the paragraph beginning at page 36, line 27, as follows:

Fig. 14 is a schematic view for illustrating another embodiment of the present invention. In Fig. 14, reference numerals 2407 and 2408 denote two CPU's. Reference numeral 2409 denotes a RAM shared by these two CPU's (2407, 2408). In Fig. 14, reference numeral 2401 denotes electric wiring for parallel transmission, and 2402 denotes optical wiring for serial

transmission. Reference numeral 2403 denotes LSIs.

Please amend the paragraph beginning at page 39, line 4, as follows:

Fig. 15 is a schematic view for illustrating another embodiment of the present invention. In Fig. 15, reference numeral 2508 denotes a spherical Si substrate and its northern (upper) hemisphere shows the surface and its southern (lower) hemisphere shows a sectional view. Reference numeral 2509 denotes a light receiving element formed on the southern hemisphere; 2503, an IC such as a bias circuit that drives the light receiving element or a preamp that amplifies an electric signal. Reference numeral 2510 denotes a optical waveguide substrate; 2506, a core layer; 2505, a clad layer; ~~2506~~ 2516, an electrode; 2512, printed wiring; 2504, a bump; 2511, output light; 2507, input light.

Please amend the paragraph beginning at page 39, line 19, as follows:

First, as shown in Fig. 16, a p-Si layer 2521, i-Si layer 2509 and n-Si layer 2520 are formed on almost half (southern hemisphere) of an undoped spherical Si substrate 2601 (diameter: about 1 ~~mmϕ~~ mm) by ion implantation to form a light receiving element region. The depth is around 0.3 μm. Crystal recovery is performed through annealing processing as required.

Please insert the following paragraph at page 41, between lines 11 and 12:

In Fig. 18, 2401 denotes a clad layer, and reference numeral 2402 denotes the optical waveguide core layer.

Please amend the paragraph beginning at page 44, line 21, as follows:

As shown in Fig. 21, the IC 3102 is formed on the hemispheric surface (here, northern hemisphere) of an undoped spherical Si substrate (1 ~~mmϕ~~ mm) 3101. This IC may be a drive IC or parallel-serial conversion circuit in the case where this IC is a light emitting element. This IC is a bias circuit, preamp, waveform shaping circuit or serial-parallel conversion circuit in the case where this IC is a light receiving element. Of course, when the IC is used for both functions, appropriate electronic circuits need to be added. These circuits can be made through a normal CMOS process and its logic voltage is 3.3 V. Reference numeral 3111 denotes electric wiring.

Please amend the paragraph beginning at page 50, line 10, as follows:

As shown in Fig. 21, an IC 3102 is produced on a part of the undoped spherical Si substrate (1 ~~mmϕ~~ mm) 3101, for example, the hemispherical surface (here, northern hemisphere). This IC may be a drive IC or parallel-serial conversion circuit in the case of a light emitting element, and it may be a bias circuit, preamp, waveform shaping circuit or serial-parallel conversion circuit in the case of a light receiving element. Of course, when the IC is used for both functions, appropriate electronic circuits need to be added. These circuits can be made through a normal FET or Bipolar process. In Fig. 24, reference numeral 3101 denotes a spherical

semiconductor substrate; 3501, a buffer layer; 3502, a clad layer; 3505, a contact layer; 3506, an electrode; 3507, a window; 3401, a selection mask.

Please amend the paragraph beginning at page 55, line 14, as follows:

As shown in Fig. 21, an IC 3102 is produced on the hemispherical surface (here, northern hemisphere) of the undoped spherical InP substrate (1 ~~mmϕ~~ mm) 3101. This IC may be a drive IC or parallel-serial conversion circuit in the case of a light emitting element, and the IC may be a bias circuit, preamp, waveform shaping circuit or serial-parallel conversion circuit in the case of a light receiving element. Of course, when the IC is used for both functions, appropriate electronic circuits need to be added. These circuits can be made through a normal FET or Bipolar process. Since it has a smaller band gap and a higher mobility compared with GaAs, it is possible to use a high-speed driver circuit.

Please amend the paragraph beginning at page 58, line 3, as follows:

A mounting example is shown in Fig. 25. In Fig. 25, reference numeral 3601 denotes a substrate made of PMMA, etc., and 3602 denotes the optical waveguide core layer made of polyimide, etc. formed thereon. On top of this, a clad layer 3603 such as of PMMA is further formed. A cavity is formed on this clad layer 3603 and core layer 3602 using photolithography, etc. so that the above-described spherical optoelectronic device can fit therein. After this, the device is fixed with UV-hardened resin, etc. (not shown). Then, contact with the printed wiring substrate 3605 is made using the Au bump 3606. The reference numeral 3604

denotes an electrode.

Please amend the paragraph beginning at page 59, line 26, as follows:

As shown in Fig. 21, an IC 3102 is formed on the hemispherical surface (here, northern hemisphere) of the undoped spherical GaN substrate (1 ~~mmϕ~~ mm) 3101. This IC may be a drive IC or parallel-serial conversion circuit in the case of a light emitting element, and the IC may be a bias circuit, preamp, waveform shaping circuit or serial-parallel conversion circuit in the case of a light receiving element. Of course, when the IC is used for both functions, appropriate electronic circuits need to be added. These circuits can be made by combining a normal FET or Bipolar process (e.g., S.C. Binari, K. Doverspike, G. Kelner H. B. Dietrich, and A. E. Wickenden; Solid State Electronics, 41 (1997), p. 97 or S. Yoshida and J. Suzuki; Journal of Applied Physics Letters, 85 (1999), p. 7931, etc.) and spherical Si process (see Embodiment 8). Since its band gap is by far larger than Si, and has therefore performance indices different from Si and other III-V materials such as capability of high temperature, high voltage and high frequency operations.

Please amend the paragraph beginning at page 65, line 21, as follows:

In Fig. 28, reference numeral 4201 denotes an undoped spherical Si substrate (e.g., 1 ~~mmϕ~~ mm); 4202, an IC formed on the hemispherical surface (here, northern hemispherical surface). Reference numeral 4203 denotes an optical device such as a light emitting element or light receiving element formed on the southern hemispherical surface (here, it is possible to use a GaInNAs AlGaAs-based planar light emitting laser or planar photodiode

formed or the four planes equivalent to (111)). Reference numeral ~~4~~204 denotes an electric wire.

Please amend the paragraph beginning at page 70, line 26, as follows:

Typical sizes of BGA pitch and ball solder are about 1 mm and 0.50 ~~mmϕ~~ mm respectively. That is, if the above-described photonic ball IC is 1 ~~mmϕ~~ mm or below, it is possible to use a normal BGA process.